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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,211	03/20/2006	Uwe Schwarz	D4695-00135	1865

8933 7590 01/28/2008

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EXAMINER	
PATEL, REEMA	
ART UNIT	**PAPER NUMBER**
2812	

MAIL DATE	DELIVERY MODE
01/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,211	SCHWARZ, UWE	
	Examiner	Art Unit	
	Reema Patel	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 March 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to an amendment filed 10/12/07.

Information Disclosure Statement

1. The information disclosure statement (IDS) was submitted on 7/3/07. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 4a. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2, 7, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Regarding these claims, claims 2, 7, and 12 depend on claims 1, 5, and 10 respectively. These parent claims disclose forming circuitries on the polished side of the wafer which infers after the polishing step which is after the wafer bonding step. Therefore, it is unclear as to how such structures can simultaneously be formed prior to wafer bonding as claimed in claims 2, 7, and 12 and still be formed after forming the polished surface as encompassed in their respective parent claims. Neither the specification nor the drawings elucidate what is meant by these limitations. Therefore, for the purposes of examination, the examiner has interpreted these claims as, "wherein *after* the wafer bonding step...structures of electronic circuitries are..."

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Petersen et al. (U.S. 6,084,257, hereinafter 'Petersen').

8. Regarding claims 1-2, Petersen discloses forming a MEMS structure comprising:

- Bonding a first silicon wafer having at least one cavity formed thereon to a second wafer as a cap wafer having an epitaxial layer, through high temperature fusion bonding via the epitaxial layer, to form a wafer composite (col 7, lines 15-38; Fig. 8c);
- Wherein the wafer composite is reduced from the second wafer towards the epitaxial layer, down to a membrane thickness corresponding to a micromechanical portion of the sensor with a thickness of a device responding to mechanical stress, and wherein the wafer composite is finally polished to provide a polished surface (col 7, lines 47-48; Fig. 8d);
- Wherein after the polishing step, electronic sensor structures associated to the cavity are commonly manufactured along with one of analog or digital circuitries on the polished surface by a CMOS technology method (col 7, lines 50-52, line 50 - col 8, line 35; Fig. 8e-g).

9. Regarding claim 4, Petersen discloses the electronic structures created at the side facing the cavity comprises a specific sensor for analysis of a medium located adjacent to the membrane in the cavity (col 5, line 62 – col 6, line 12).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen et al. (U.S. 6,084,257, hereinafter 'Petersen') as applied to claim 1 above, and further in view of Shaw et al. (U.S. 5,846,849, hereinafter 'Shaw').

12. Regarding claims 3 and 14, Petersen discloses electronic sensor structures and circuitry are formed by conventional methods and on the polished side of the wafer composite (col 7, line 50 – col 8, line 35). Yet, Petersen does not explicitly disclose that the electronic structures and circuitry form electronically conductive channels at least partially in the thinned epitaxial layer and through the polished side of the wafer. However, Shaw discloses the use of conductive vias so as to connect the sensor to the integrated circuit in a MEMS device (col 8, lines 31-35; col 17, lines 7-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Petersen with using conductive vias or channels, as taught by Shaw, so as to connect the MEMS sensors in the epitaxial layer to the circuitry on the polished side of the wafer.

13. Claims 5-9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen et al. (U.S. 6,084,257, hereinafter 'Petersen') in view of Shaw et al. (U.S. 5,846,849, hereinafter 'Shaw').

14. Regarding claims 5-8 and 15, Petersen discloses a method of forming a micromechanical sensor system by the following steps:

- Bonding a first silicon wafer having at least one cavity formed thereon to a second wafer as a cap wafer having an epitaxial layer, through high

temperature fusion bonding via the epitaxial layer, to form a wafer composite (col 7, lines 15-38; Fig. 8c);

- Wherein the wafer composite is thinned from the second wafer down towards the epitaxial layer, down to a membrane thickness corresponding to a micromechanical portion of the sensor with a thickness of a device responding to mechanical stress, and wherein the wafer composite is finally polished to provide a polished surface (col 7, lines 47-48; Fig. 8d);
- Wherein after the polishing step, at least one sensor structure associated to the cavity is commonly manufactured along with one of analog or digital circuitries on the polished surface by a CMOS technology method (col 7, lines 50-52, line 50 - col 8, line 35; Fig. 8e-g).

15. Petersen discloses a sensor structure associated to the cavity is formed in the thinned epitaxial layer but does not disclose that the circuit if formed at least partially in the thinned epitaxial layer. However, Shaw discloses the use of conductive vias so as to connect the sensor to the integrated circuit in a MEMS device (col 8, lines 31-35; col 17, lines 7-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Petersen with using conductive vias or channels, as taught by Shaw, so as to connect the MEMS sensors in the epitaxial layer to the circuitry on the polished side of the wafer.

16. Regarding claim 9, Petersen discloses the electronic structures created at the side facing the cavity comprises a specific sensor for analysis of a medium located adjacent to the membrane in the cavity (col 5, line 62 – col 6, line 12).

17. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen et al. (U.S. 6,084,257, hereinafter 'Petersen') in view of Shaw et al. (U.S. 5,846,849, hereinafter 'Shaw').

18. Regarding claims 10-13, Petersen discloses a micromechanical sensor system by comprising:

- A first silicon wafer having at least one cavity bonded to a second wafer as a cap wafer having an epitaxial layer, by high temperature fusion bonding via the epitaxial layer, so as to form a composite of wafers (col 7, lines 15-38; Fig. 8c);
- Wherein the composite of wafers is thinned from the second wafer down towards the epitaxial layer, down to a membrane thickness corresponding to a micromechanical portion of the sensor with a thickness of a device responding to mechanical stress, and wherein the wafer composite is finally polished to provide a polished surface (col 7, lines 47-48; Fig. 8d);
- Wherein a mechanical sensor structure is aligned to the cavity and it commonly manufactured along with one of an analog or digital circuit on the polished surface by a CMOS technology method (col 7, lines 50-52, line 50 - col 8, line 35; Fig. 8e-g).

19. Petersen discloses a sensor structure associated to the cavity is formed in the thinned epitaxial layer but does not disclose that the circuit if formed at least partially in the thinned epitaxial layer. However, Shaw discloses the use of conductive vias so as to connect the sensor to the integrated circuit in a MEMS device (col 8, lines 31-35; col

17, lines 7-11). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Petersen with using conductive vias or channels, as taught by Shaw, so as to connect the MEMS sensors in the epitaxial layer to the circuitry on the polished side of the wafer.

Response to Arguments

20. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reema Patel whose telephone number is 571-270-1436. The examiner can normally be reached on M-F, 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RSP
1/16/08